

**JTEG MEETING  
NEW PROJECT IDEAS**

**AUTOMATED TEST EQUIPMENT SOFTWARE ANALYSIS  
AND TEST PROGRAM SET TRANSLATION TOOL**

- Minimize recurring cost when migrating test program set (TPS) to new automated test equipment (ATE) platform(s)
- Develop automated methods for extracting test requirements from legacy ATE/TPS
- Develop “Middleware” to generate new TPS on modern system(s)
- Enable data collection for trend analysis and knowledge base development

**Status:** Team being formed & draft scope document in review, Warner-Robins likely beta site.

**Depot interest:** Warner Robins ALC, Oklahoma City ALC, Ogden ALC  
Tobyhanna Army Depot, NUWC Keyport

**Industry interest:** Teradyne, Honeywell, Agilent

**NCMS contact:** Lee Patch, leep@ncms.org, 734-995-4972

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**SYNTHETIC INSTRUMENTATION INSERTION FOR  
AUTOMATED TEST EQUIPMENT (ATE)**

- Address instrumentation obsolescence
- Develop multi-use, software-configurable, test instrument technology
- Provide a path for common test platform
- Include Boundary Scan capability
- Minimize upgrade costs

**Depot interest:** Warner Robins ALC, Oklahoma City ALC, Ogden ALC,  
Tobyhanna Army Depot, NUWC Keyport,

**Industry interest:** Honeywell, Agilent, Huntron

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**ADDITIONAL PROJECT IDEAS**

- Automated conformal coating removal (NCMS to review Tobyhanna project)
- Predictive maintenance tools - can we integrate CALCE POF tools with preventative maintenance tools (AF ManTech interest – Peter Black, Redstone Arsenal, (256) 876-3004)
- Modeling and simulation for test & evaluation
- Automated contact cleaning (pins & fingers)
- Infra Red (IR) imaging of phased array antenna emissions
- Wireless automated monitoring of harness/cable status on shipyard cranes

**NCMS contact:** Lee Patch, leep@ncms.org, 734-995-4972  
NCMS needs Depot and Industry technical contacts

## **JTEG MEETING NEW PROJECT IDEAS**

### **3D Manufacturing (STEP) –**

This project idea proved to be related to the Product Lifecycle Data Management for Six Sigma Quality project that NCMS has worked since early this year. The basic concept for the project is to embed in a Unigraphics solid model all of the tolerance and engineering requirements information usually only found on a 2D engineering drawing and construct interfaces that enable access and use by downstream applications. The 3D Manufacturing idea is to do exactly the same thing but in a STEP environment. This project should be ready to submit for approval in July.

**Industry participants** are GE Aircraft Engines, Pratt & Whitney, EDS, Boeing, Cohesia, and BCT-Technology.

**Logistics participants** are Tinker AFB, Anniston Army Base, Albany Marine Base

**NCMS contact:** Thomas L. (Tony) Haynes, 734.995.4930, [tonyh@ncms.org](mailto:tonyh@ncms.org)

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### **Residual Stress Management in Machined Parts –**

This idea was offered by Sikorsky outside the Symposium structure. The concept is to develop simulation tools and machining processes that address the problem of aluminum forgings distorting when machine operations relieve residual stresses. A reasonable project plan and an early draft for the concept paper are developed. The NCMS goal is to submit this project no later than August.

**Industry team** is Sikorsky, Boeing, Alcoa, MSC Software, and Cincinnati Machine.

**Logistics** support is being solicited, a logistics champion is needed.

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### **Rapid Manufacturing and Repair –** Performed a bit of technology search work and held a couple of conversations with Mike Stark of Red River Arsenal.

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Need industry and logistics contacts.

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### **High Performance Motion Control –** Preliminary investigation has begun to better understand the need.

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Need industry and logistics contacts

## **JTEG MEETING NEW PROJECT IDEAS**

### **Laser Repair In-Situ Plating & In-Situ Quality Monitoring**

**Description:** In-situ plating part repair techniques are used for large components that need surface repair in small areas, components too large to immerse in solution or components that are too difficult and expensive to remove from air, sea or ground vehicles. Traditional in-situ plating or part repair techniques such as Brush Electro-deposition Plating are addressing this need but are very time consuming and labor intensive. Brush Plating is also limited in materials that can be plated; particularly materials such as Titanium, Tungsten, and Tantalum have very poor surface adhesion with Brush Plating. Additionally, in many instances when the component is subjected to higher stresses, the conventional plating does not provide sufficient bonding strength, causing premature component failure – thereby providing in a repair of limited life duration.

There is an urgent need at DOD repair depots for equipment with in-situ plating replacement capabilities, which would dramatically reduce the time to repair critical components, while reducing recurring repair costs. The capabilities to perform in-situ part repairs for corrosion protection or dimensional restoration will significantly improve the US military weapons systems support and readiness.

**Industry Interest:** Boeing, Siemens-Westinghouse, Pen State, H & R Technology, POM Group, Toolmen/SMU, & Fraunhofer USA

**Depot Interest:** OC-ALC, Hill AFB, Barstow MC3, Albany MC3, & NAVSEA-Keyport

**NCMS contact:** Steven Hale, [steveh@ncms.org](mailto:steveh@ncms.org), 734-995-2195

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### **SERIALIZED TRACKING INCLUDING AVIONICS AND ELECTRONICS**

**Description:** Using a 2D mark, permanently identify parts & develop getting data into a data base.

**Industry Interest:** RVSI, Sikorsky, Boeing, Cincinnati Machine, Knovalent, Monode, ID Integrations, AES Total Quality Systems, Telesis, & Fraunhofer USA

**Depot Interest:** Cherry Point NADEP, USMC, OC-ALC, Puget Sound NSY, TACOM-ARDEC

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### **COATING REMOVAL AND SURFACE PREP OF METALS**

**Description:** The use of laser energy to remove paints, sealants, corrosion and other coatings becomes increasingly feasible with the progressive improvements in the basic technology and the energy delivery systems. The recent diode-pumped, pulsed, solid-state lasers are providing progressively greater wall plug efficiencies and smaller size (footprint.) They also permit energy delivery to the work surface via fiber optics. Consequently, today's systems are more flexible, portable and cost-effective than they were only a few years ago.

Items can now be cleaned without extensive disassembly, and without bringing them to the 'laser lab.' The laser can now travel with the other portable maintenance equipment, such as welders and compressors.

Advantages of laser cleaning and decoating are not trivial. First is the environmental advantage, brought about by the fact that the laser needs no secondary waste stream. It's a 'zero-added-waste technology. Moreover, many coatings are partially volatilized, so even the coating residues are often reduced by as much as 70%. Compared to traditional stripping/cleaning methods, the reductions in disposable waste approach orders of magnitude when the laser is employed.

**Industry Interest:** Boeing, General Lasertronics, Sikorsky, Lockheed martin, Siemens-Westinghouse, Penn State, & Fraunhofer USA

**Depot interest:** OC-ALC, Hill AFB, Pearl Harbor NSY, ISMC, Anniston Army, & WR-ALC/AE

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## **JTEG MEETING NEW PROJECT IDEAS**

### **Friction Stir Welding**

NCMS research of the topical area indicates user interests possibly in

- friction stir spot welding,
- friction stir of aluminum plate and sheet at varying thicknesses,
- Examine performance and durability of friction stir weld vs. traditional weld type being replaced
- Examine leak tightness
- Examine metallurgical differences in the welded materials
- Examine process differences, limitations
- USCAR is interested in collaborating and the rail car industry uses Friction Stir

Interested Participants

- Cincinnati Machine, Boeing, USMC were identified at the CTMA Conference in April

**NCMS Contacts** - Gary Burkart, gburkart@charter.net, 612-839-4567

Connie Philips, [conniep@ncms.org](mailto:conniep@ncms.org), 734-995-7051, Project Manager

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### **Precision Folded Plate Technology for Forward Deployment and Maintenance**

Scope of the project and application focus is being defined based on anticipated budget availability

2 applications currently in view:

- Workstands for maintenance applications
- Battle beam for rigid structural members

Interested Participants: Participant team is being defined; still recruiting end user participants and depots

- Industrial Origami, Sikorsky, Caterpillar, Boeing, H&R Technologies, SolidWorks, Metalsoft, U of Mich, NASA, Anniston Army Depot, OC-ALC, Pearl Harbor NSY, China Lake NAVAL, Cherry Point NADEP, Barstow MC3 and Albany MC3 have expressed interest

**NCMS Contacts** - Gary Burkart gburkart@charter.net, 612-839-4567

Connie Philips, [conniep@ncms.org](mailto:conniep@ncms.org), 734-995-7051, Project Manager

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### **New Methods of Removal of Sealants/Coating and Rejuvenation of Sealants/Coatings**

(Parts: Bladder/fuel tank/access panels)

2-3 phase study:

- Evaluation of new methods available commercially for chemical and mechanical removal of sealants and coatings. If successful, pursue Federal approval of new methods.
- Examine feasibility of chemically rejuvenating existing sealant(s) in-situ.
- Evaluation of new sealants as substitutes for existing sealants, looking for performance, longevity and ease of maintenance and removal. If successful, pursue Federal approval.

Interested Participants:

- Boeing is Champion, OC-ALC, WR-ALC, Elixair, Helitech, Lasertronics, OO-ALC were identified at the NCMS CTMA Conference in April.
- Cherry Point
- North American Airframe Services, Fuel Systems Specialists
- Numerous contractors have indicated interest
- Recruiting user interest: UTC, Lockheed, Sikorsky, other airframers

**NCMS Contacts:**

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Boeing Champion: Bud Westerman, 206-662-1948

## **JTED MEETING NEW PROJECT IDEAS**

### **THICK COMPOSITE STRUCTURAL REPAIR (>2 inches thick)**

Identified weapon system/DoD client: Army's Future Combat System (FCS) and DDX—future naval combatants.

Attributes & Scope of Technology Needs:

- Multiple Functionality Structural Composites
- Multiple Bond Lines
- Real Time Cure Knowledge
- Innovative Processes/Tooling (VARTM/liquid molding)
- Preform Processing/Handling

Interested Participants: United Defense, General Dynamics Land Systems, Boeing (FCS System Integrator with SAIC), Northrop/Grumman, Bath Iron Works, AvPro, Seeman's Composites, University of Delaware- Center for Composite Materials (CCM), SCRA – Navy Mantech, Cyclics Corp., Dow Chemical

Interested Depot Participants: Army/Navy Mantech, Anniston Army Depot.

Actions and Status (since CTMA Symposium):

NCMS contacted Cyclics Corp. (a resin supplier presently evaluating ballistic applications of thick thermoplastic polyester-based composites) for abstract, listing the material's attributes.

A project idea was published in the May 2003 CTMA Connector issue – no Depot interest has been expressed.

Need depots for input on specific target parts – are these for currently fielded weapon systems?

Need to contact composite suppliers for other candidate technology ideas, and obtain consensus from large commercial OEMs.

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### **OVERHAUL AND REPAIR USING COMPOSITES**

Identified weapon system/DoD client: TBD

- Material Substitution
- Low Temperature Cure
- Low Cost Tooling
- Real Time Process Control
- Integrate NDE Technologies into Process Controls
- Repair Design Analysis (process)
- Inspection (NDI)
- Modification Process
- Paint Removal
- Certification

Interested Industry Participants: Advance Processing Technology, Boeing, Sikorsky, Lastertronics, GE Engines

Interested Depot Participants: Cherry Point NADEP, OO-ALC, CCAD

Actions and Status (since CTMA Symposium):

An initial teleconference was held by NCMS (Manish Mehta and Connie Philips) on May 12 - attended by P&W/Sikorsky, GEAE, and AvPro representatives, but could not reach agreement on specific technology thrust area, several attendees



agreed on need for better cure monitoring technology for complex parts repair operations.

Need Depots' target parts/needs so focused proposal outline can be prepared.

May need to narrow the current list of repair items to a more manageable level.

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**Additional Project Ideas (track 2 - Composites and Lightweight Structures):**

- No post-Symposium Activity to report, need depot or industry ideas on specific needs/issues.

1. Weight Reduction (Recapitalization)
2. Composite Armor and Aircraft Repair Tech. (e.g., FCS, Boeing and Aircraft Repair) - Multiple Bond Line Repair
3. Non Destructive Evaluation and Inspection Criteria
4. Composite Degradation: New Processes and Materials studies to Repair
5. Joining of Composites (Similar and Dissimilar)
6. Parts Tracking for Composites
7. Low Observables (LO) Capabilities at Depots
8. Repair, Paint, Test/Verify
9. Predictive Analysis and Maintenance Capabilities
10. Repair Methods for Joint Strike Fighter (Unique Issues)
11. Cosmetic/Touch-up Training in Composites Technology/Kits
12. Composite Superstructures
13. Fire Retardant Technology
14. Corrosion and Substitution Materials
15. Lower Temperature Cure Film Adhesives
16. Real Time Composite Cure Monitoring
17. Reconfigurable Tooling (e.g. 2Phase project) and RM/RT
18. Effort and Handling Reduction via Automation in Depots
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Need depot and industry contacts